WHAT IS CLAIMED IS:

1. A wideband erbium-doped optical fiber amplifier, for use with a first and second wavelength band optical signals, having a first optical path and a second optical path parallel to each other, comprising:

a first amplifying section disposed on the first optical path, including a first erbium-doped optical fiber to amplify the first-band optical signals, a filter to gain-flatten the amplified first-band optical signals, wherein a reflected portion of the first band optical signal by the filter is directed to the second optical path; and

a second amplifying section disposed on the second optical path, having a second erbium-doped optical fiber to amplify received second-band optical signals,

wherein the reflected first-band optical signal is used to pump the second erbium-doped optical fiber.

2. The wideband erbium-doped optical fiber amplifier as claimed in claim 1, wherein the wideband erbium-doped optical fiber amplifier is disposed on an optical fiber through which first and second wavelength band optical signals are transmitted.

3. The wideband erbium-doped optical fiber amplifier as claimed in claim 1, wherein the first and second wavelength band optical signals are a C-band and a L-band optical signal.

4. The wideband erbium-doped optical fiber amplifier as claimed in claim 3, further including a circulator disposed between the second optical path and the filter, the circulator used to output the amplified C-band optical signal to the filter and the reflected portion of the first band optical signal by the filter to the second optical path.

5. The wideband erbium-doped optical fiber amplifier as claimed in claim 1, wherein the reflected portion of the first band optical signal by the filter is a non-uniform portion in the gain spectrum.

6. The wideband erbium-doped optical fiber amplifier as claimed in claim 4, further comprising a first wavelength division multiplexing optical coupler to divide the received C-band and L-band optical signals and provide the C-band optical signal to the first optical path and the L-band optical signal to the second optical path.

7. The wideband erbium-doped optical fiber amplifier as claimed in claim 6, further comprising a fifth wavelength division multiplexing optical coupler to couple the C-band and L-band optical signals from the first and second optical paths.

8. A wideband erbium-doped optical fiber amplifier as claimed in claim 4, wherein the first amplifying section further comprises:

a first pumping light source to output a first pumping light for use by the first erbium-doped optical fiber; and

a second wavelength division multiplexing optical coupler to provide the first pumping light to the first erbium-doped optical fiber.

9. A wideband erbium-doped optical fiber amplifier as claimed in claim 8, wherein the first amplifying section further comprises a first isolator disposed on the first optical path to intercept backward light.

10. A wideband erbium-doped optical fiber amplifier as claimed in claim 1, wherein the second amplifying section further comprises:

a second pumping light source to provide a third pumping light for use by the second erbium-doped optical fiber; and

a fourth wavelength division multiplexing optical coupler to provide the third pumping light to the second erbium-doped optical fiber.

11. A wideband erbium-doped optical fiber amplifier as claimed in claim 10, wherein the second amplifying section further comprises a second isolator disposed on the second optical path to intercept backward light.

12. A wideband erbium-doped optical fiber amplifier as claimed in claim 4, wherein the filter comprises a chirped optical fiber grating.

13. A wideband erbium-doped optical fiber amplifier as claimed in claim 4, wherein the second erbium-doped optical fiber is pumped forward by the reflected C-band optical signal.

14. A wideband erbium-doped optical fiber amplifier as claimed in claim 1, wherein the second erbium-doped optical fiber is pumped backward by the reflected C-band optical signal.